

## GET ACQUAINTED WITH YOUR CAR

Learn Why the Engine Runs  
and How and Other  
Points.

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There may be a perfectly good motor in your car, the gears and brakes and tires and other members may be all that could be desired, but unless the engine works the car never will get anywhere. It would be interesting to know just how many of the million motorists understand the working of the motor and how the power is applied to running the car. Oh, yes, they can start the engine—sometimes—and can steer the car, but experience indicates that a tremendous percentage of drivers have but a primitive acquaintance with the mechanism and the principles underlying its action.

The motor generates power which drives the automobile. This is done by taking into the motor gasoline, which is burned and in that process expands, creating pressure. It is the function of the motor mechanism to transmit this pressure into usable power. The gasoline usually is carried in a tank located at the rear of the car frame. From this tank it is drawn, by suction from the intake manifold, into a small tank located near the engine, whence it flows by gravity to the carburetor.

Raw gasoline burns very slowly and is not suitable for use in the automobile engine, where combustion is fast burning is required. The function of the carburetor is to mix the gasoline with the proper proportion of air and turn it into a vapor to make it burn more rapidly.

In addition to mixing and vaporizing, the carburetor is fitted with a throttle valve with which the amount of mixture allowed to enter the cylinder may be regulated. In this way the development of motor power is controlled. The gas is drawn from the carburetor past the throttle and through the inlet valve into the cylinder on the suction or intake stroke. It is then compressed and ignited by an electric spark, then expands and gives the power.

The action of the motor is that by drawing down the piston a vacuum is created in the upper part of the cylinder, called the combustion chamber. At the right moment the inlet valve opens and a charge of mixture is sucked in. The valve closes and the piston, rising, compresses the mixture. At the highest point of piston motion a spark is produced at the plug, the mixture is fired, expands and forces the piston down with power. Through the connecting rod the downward force is changed into rotary motion in the crank shaft and the repetition of this process gives the power which drives the car. The flywheel carries the crank over the strokes which do not produce power.

There are four strokes to each motor cycle, the four cycle being in strict parlance a four stroke cycle. The first stroke, the intake stroke, is the suction stroke; the next, as the piston rises, is the compression stroke. An explosion sends the piston down on the power stroke and rising on the exhaust stroke. The piston takes two full revolutions of the crank shaft, or two cycles, two up and two down strokes. On a four cylinder motor there is always one power stroke and one of each of the other strokes at the same time.

The explosion or power stroke does not come in regular sequence in the cylinders, that is, they do not fire 1, 2, 3, 4; usually it is 1, 3, 4, 2, though some motors have it 1, 2, 4, 3. In motors with a larger number of cylinders the order varies, one firing order for an eight cylinder motor being 1, 4, 5, 2, 7, 6, 3, 8.

It will be seen from the foregoing that it takes three things to make an engine go: A proper mixture of gasoline and air, compression and ignition at the right time. A proper mixture would be considered 200 cubic feet of air to a pint of gasoline, but to insure proper scavenging more air usually is introduced. In starting more gasoline is admitted to the vaporizing chamber to give a rich, easily ignited mixture; in running a lean mixture gives better results. The compression also must be good, so that there is a decided resistance when the motor is cranked over by hand. The compression heats the mixture almost to the firing point, and when the spark occurs ignition is easy. To insure good compression there must be the proper relation between piston rings and cylinder, and there must be a seal of lubricating oil in addition to make the combustion chamber practically gas tight. Valves must seat properly and cocks, magnets and other openings be free from leaks.

Not the least important is the spark. This comes from a battery, or magneto, in low voltage, stepped up to high voltage by means of a coil, so that the spark produced across the points of the plug is hot and possesses of the requisite "kick"—something more than 2.75 being needed. It is distributed to the cylinders by a distributor, or timing device, so that the spark comes at the point of highest compression. In starting the spark is retarded to prevent back pressure, or motion, and when the engine is burning the spark is advanced so that ignition of the mixture, started before the piston is top of cylinder, will be full as the piston starts to descend on the power stroke, insuring full power from the combustion.

Another device whose importance is much underrated by the average driver is the muffler, through which the burned mixture is ejected into the open air. If there were simply a pipe from the motor without something to deaden the sound the burned gas coming from the motor under pressure would make a

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great noise, knocking a great hole in the air as a gun, or as lightning does. The muffler permits the gas to cool and contract before issuing to the air, and lets it out slowly and with less violence. Gas heated expands rapidly, cooled it contracts rapidly, naturally a cooled gas would be of smaller volume than that right from the motor and would make less of a "hole" in the atmosphere. The difference is easily illustrated if there be a cutout on the car.

The next article will be on transmission: "Putting the Power to Work."

### MOTOR TRANSPORT COURSE.

Engineering Department Opened at New York University.

A course in motor transportation engineering is to be added to the curriculum of New York University, to begin in February, according to an announcement made by Dean Charles H. Snow of the School of Applied Science. The new study, which is considered a clear indication of the ascending importance of motor truck transportation, is to be given by P. Van Z. Lane, chief transportation engineer of the Packard Motor Car Company, Detroit. It will be a part of the new course in industrial engineering and will be open to students in mechanical and civil engineering, particularly those specializing in subjects relating to highway engineering.

The course will have more to do with the application of the motor truck than the mechanics of it, according to Mr. Lane. The motor truck is part of the mechanical equipment of every industry and engineers entering any industry must become more familiar with its application, he says. "The course in motor transportation will deal solely with the application of the truck as a transportation unit in industry and is not to be confused with motor truck design. It has been proved under the most trying circumstances that the motor truck is mechanically dependable and that by applying it correctly it is an economical means of transport and that to get the most efficient service from their equipment those in industry should understand how it can be used with the greatest effectiveness. New York, which is the largest user of motor trucks in the country, is a huge laboratory for this work."

### SERVICE TO OWNERS.

Automobile Club of New York Helps Members.

The unprecedented demand for automobile licenses for 1920, coupled with the necessity of obtaining a driving license for owners in the Greater City and the delay in figuring out the correct amounts according to the new and somewhat complicated schedule of rates, has caused a jam of unexpected proportions at the Secretary of State's headquarters on upper Broadway. Anticipating this condition the Automobile Club of New York has made arrangements with Secretary Hugo to take care of licensees for its members at the club's headquarters in the Hotel Ansonia, thus saving them all annoyance and delay. All that is necessary for a member to do is to send his renewal card to Paul Archibald, secretary, who figures the rate and notifies the member by phone, who then sends his check for the necessary amount to cover. The plates are delivered next day by messenger and the whole transaction is completed without the member leaving his desk or making any calculations at all or otherwise.

This is but one of the numerous privileges which members of this very live club enjoy without other charge than the original membership fee, and none should overlook the other unusual opportunities which the club affords in the way of discounts on anything pertaining to the automobile, free map and booklet service, and, in short, anything which comes under the head of real service to the car owner.

## INTERESTING WAY TO MAKE TRIP SOUTH

Atlantic Highway Offers Many  
Advantages for Long Jour-  
ney to Florida.

Motor tourists who are planning to go South in their cars this winter will welcome the 1920 edition of the "Atlantic Motorway," just off the press after some delay occasioned by the printers' strike. This booklet carries a great advance over previous issues, and contains all that is necessary for a traveler to know on the trip from New York to Miami.

A tour to the South to-day involves very much less preparation and fewer road difficulties than was formerly the case, provided one takes the right road and refuses to be misled by hearsay evidence or way-side gossip, according to Henry MacNair, publisher and author of the little book in question, who prepared the text and maps from actual notes which he took on the road two months ago.

Unlike some other sections of the country, there is but one best way to go South, and the "Atlantic Motorway" devotes its entire attention to the details of the only route which the wise tourist will take in order to escape mishaps, mud holes and impossible inns. The line followed is generally that of the Atlantic Highway, with several deviations, the most conspicuous of which is between New York and Washington, between South Hill and Maaleik, and between Augusta and Jacksonville, in each of which cases the main road is in very bad condition for winter travel. On other sections, particularly between Washington and Richmond, marked improvement is shown this year.

Opposite each page of text, which has been condensed to absolutely essential running directions, is a detailed map in colors showing the entire countryside to a width of fifteen miles, with rivers, railroads and other landmarks properly named and located. At the most convenient stopping points is given the name of the best hotel, so that the tourist may know without further inquiry where he may expect comfort and courtesy. Copies of this indispensable little mentor, which will save South-bound tourists many dollars and heart-breaking delays, may be had on application at the rooms of the Automobile Club of New York, Hotel Ansonia, of which rapidly growing organization Mr. MacNair is chairman. An itinerary of the trip follows:

### ITINERARY NEW YORK TO MIAMI.

Day	Miles
1—New York to Lancaster, Stever House, all sea-coast...	161.5
2—Lancaster to Washington, Hotel Potomac, all macadam...	126.3
3—Washington to Richmond, the Jefferson, macadam, concrete, grave, few rough spots...	123.5
4—Richmond to Henderson, Vance Hotel, via Cannon's Ferry, fair to excellent gravel and sand-clay...	119.1
5—Henderson to Pinehurst, The Carolina, Holly Inn, Raleigh, excellent, sand-clay, balance rough, but no mud holes...	124.2
6—Pinehurst to Camden, The Kirkwood, All sand-clay, with some rough stretches, lunch at Queraw, the Covington...	112.9
7—Camden to Augusta, Partridge Inn, All fair to good sand-clay, lunch at Wilcox...	113.3
8—Augusta to Macon, Deary Hotel, Mostly good sand-clay...	125.7
9—Macon to Waycross, Thomas Hotel, Mostly good sand-clay...	122.8
10—Waycross to St. Augustine, Ponce de Leon, Alcazar, Likely to be bad to west of Jacksonville, balance brick...	115.6
11—St. Augustine to Rockledge, Capitol House, Brick and shell...	148.7
12—Rockledge to Palm Beach, Poinciana, Breakers, Shell and seashell...	120.7
13—Palm Beach to Miami, Hotel Uruguay, Coquina and shell...	71.7
Total New York to Miami.....	1,453.1

## A Tip in Time Saves—Money.



Don't leave the engine running to prevent freezing when machine is stopped at the curb. Put non-freezing solution in the radiator.



Don't engage clutch sharply, apply brake harshly, nor round corners at a high rate of speed.



Have small cuts in tire tread that reach into fabric sealed immediately.



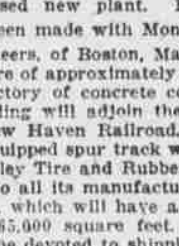
Use non-skid chains when streets are slippery and take them off when not needed.



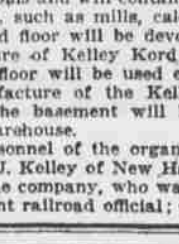
Don't adjust non-skid chains so loose that they fall off, nor so tight that they won't creep.



Keep accurate record of tire mileage and buy the make giving lowest cost per mile.



Don't keep engine racing when stopping in traffic.



Drive with spark advanced as far as possible without causing engine to knock.

Inspect oil level in engine, amount of water in the radiator, and pressure in tires each time before leaving the garage.

Don't take the engine apart just to see what is inside of it.

Learn what care the car requires, how to make minor repairs and adjustments, and how to get the best service from it.

## MIDWINTER TOURING BREAKS RECORD

Absence of Snow Makes Riding  
Possible in Many Popu-  
lar Sections.

Although the winter so far has been a severe one, at least as regards temperature, very little snow has fallen, even in sections of New England and New York State. The absence of snow and ice on most of the main roads in the East has naturally increased the amount of automobile touring and so frequent have been the requests for road information that the Touring Bureau of the American Automobile Association, at 501 Fifth Avenue, has found it necessary to compile a large amount of up-to-the-minute data about present trunk-route conditions.

The Albany Post Road to Albany, as well as the trunk line to Buffalo via Utica and Syracuse, are open and in good condition throughout. The alternate route to Boston via New London and Providence are also certain of unimpeded freedom of traffic, both of these trunk routes being hard surfaced and in almost uniformly excellent condition.

Deep snow drifts which usually isolate the Berkshires in midwinter, are this year conspicuous by their absence, and this famous region may now be reached by a direct road, which is in very good condition except for short stretches between Millerton and Lakeville and on both sides of Stockbridge.

Motorists are cautioned against attempting to cut across Southern New York State in order to reach Cleveland and points further west by way of Jamestown and Erie, as the snow is 18 or 20 inches deep in places along this route, and none but high-powered cars can get through at present.

The Lincoln Highway to Pittsburgh is being kept open by traffic as much as possible, though the roads in the mountains of Western Pennsylvania are often slippery and dangerous. Washington and all points in the Southern States are accessible without difficulty, as there is no snow along the route to the national capital. Additional details about present road conditions in the East and South are available upon application to the A. A. A. Touring Bureau.

**ELSEY CO. TAKES ON REPUBLIC.**  
The Elsey Motor Company, dealer for Dodge Bros. and Chandler motor cars, has just been made Brook county distributor of the Republic truck by J. J. H. Truck Company, Inc., which handles the Republic truck in New York.

A complete stock of parts will be carried at the Elsey service station, 383 1/2 street and the Concord.

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## Sidney Bowman's New Building.



An announcement of unusual interest is made by the Sidney B. Bowman Cycle Company that they had completed plans for the erection of their own building to cover the entire Broadway frontage of the block located between 131st and 132nd streets. This modern and up-to-the-minute building of four floors and a basement will comprise a total floor space of 100,000 square feet. It is especially designed for the departmental specialization of the many activities that are now required by a big establishment for the distribution of automobiles and trucks in a large territory and the rendering of prompt and efficient service to owners and dealers. Here also will be located their salesmen for Kiesel trucks. Their main passenger car showroom at 1672 Broadway, corner Fifty-second street, will be continued and an additional salesroom for passenger cars maintained in the new building. The Bowman organization has been in existence for 27 years; the first 19

### HIS CHALMERS IS A WONDER.

Hasn't Had Any Repairs in Four Years.

The following letter has been received by Harry J. De Bear, New York Maxwell-Chalmers manager, from Luby Manware of South Charleston, W. Va., owner of a Chalmers:

"Two years ago I bought this car from a fellow who previously had it for four years," says the writer. "This car has been run by him during this time without any trouble, and also since the time I bought the car from him it has been running in perfect condition. It is a Chalmers 1919, Model F. This car has never had to be repaired. The valves have never been ground during four years—that is, the two years I had it and two years that the previous owner had it."

"Three weeks ago I started from New Haven, Conn., for Charleston, W. Va., and arrived there without a mishap during the whole journey. On the way down we rode four hundred miles off our course, which made the trip down about twice hundred miles. On the way down we encountered swamps that were five

miles long, and ploughed up roads. We drove over rocks and went through places that stalled others. We went over more than fifty hills in the mountains, and the higher they were the easier we seemed to go over. Here we also struck innumerable streams and bad roads. At times, because the crank case lay so close to the ground, we struck lumps of hard mud which fairly lifted the wheels in the air, but on we went, feeling the dirt being ploughed and ripped up as we went by. Of this trip six hundred miles were over bad roads. We travelled through the rain for four nights, which made the roads much worse. At one time we struck a road fifty miles long with mud a foot deep. We finally arrived without a puncture or a blowout and the car is still in perfect running condition."

**Primer Connections.**  
When a cup or other form of dash primer is used, the tube which connects with the manifold is apt to become disconnected by vibration. To obviate this trouble solder a sleeve on the end of the tube and allow a slip connection with the reservoir.

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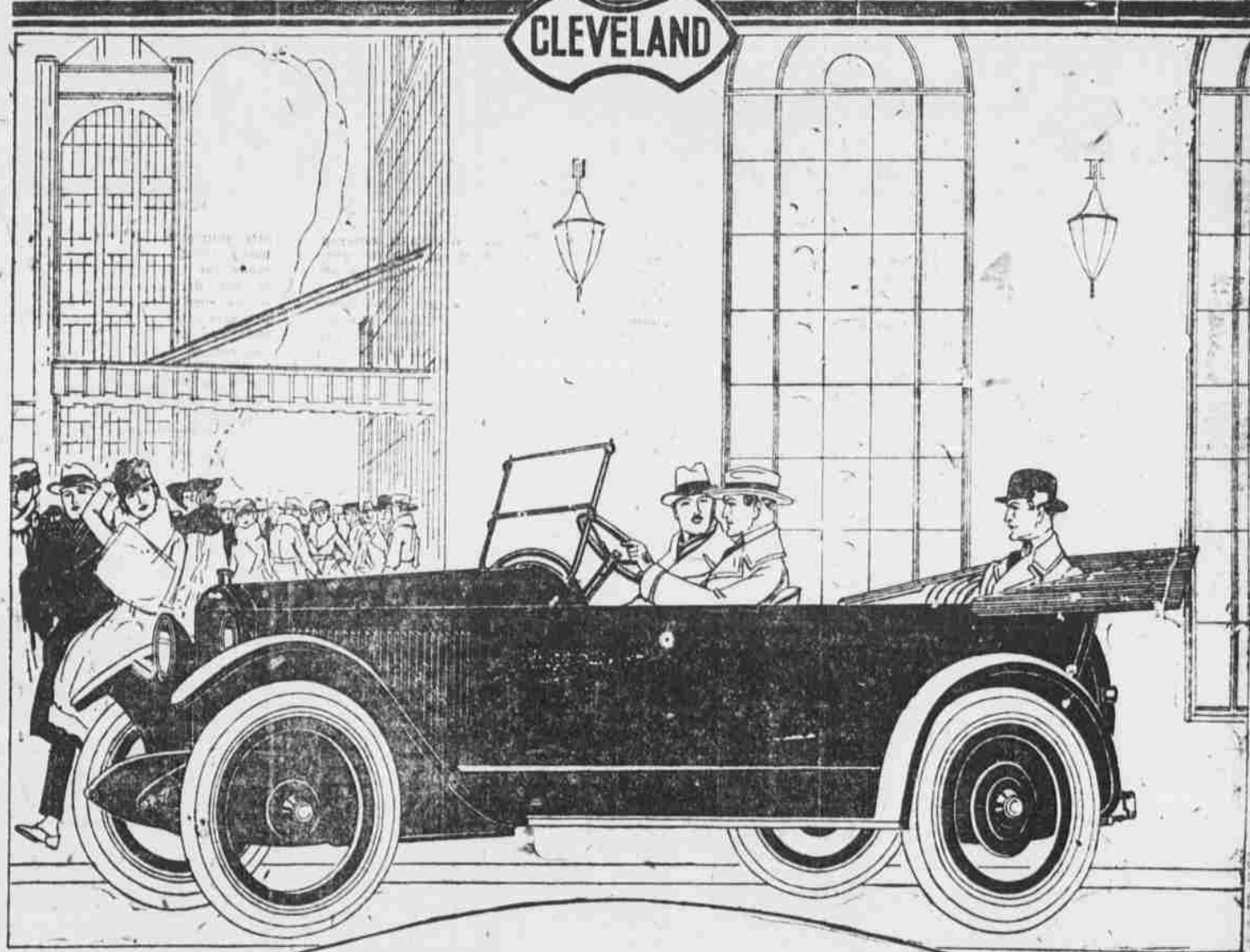
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